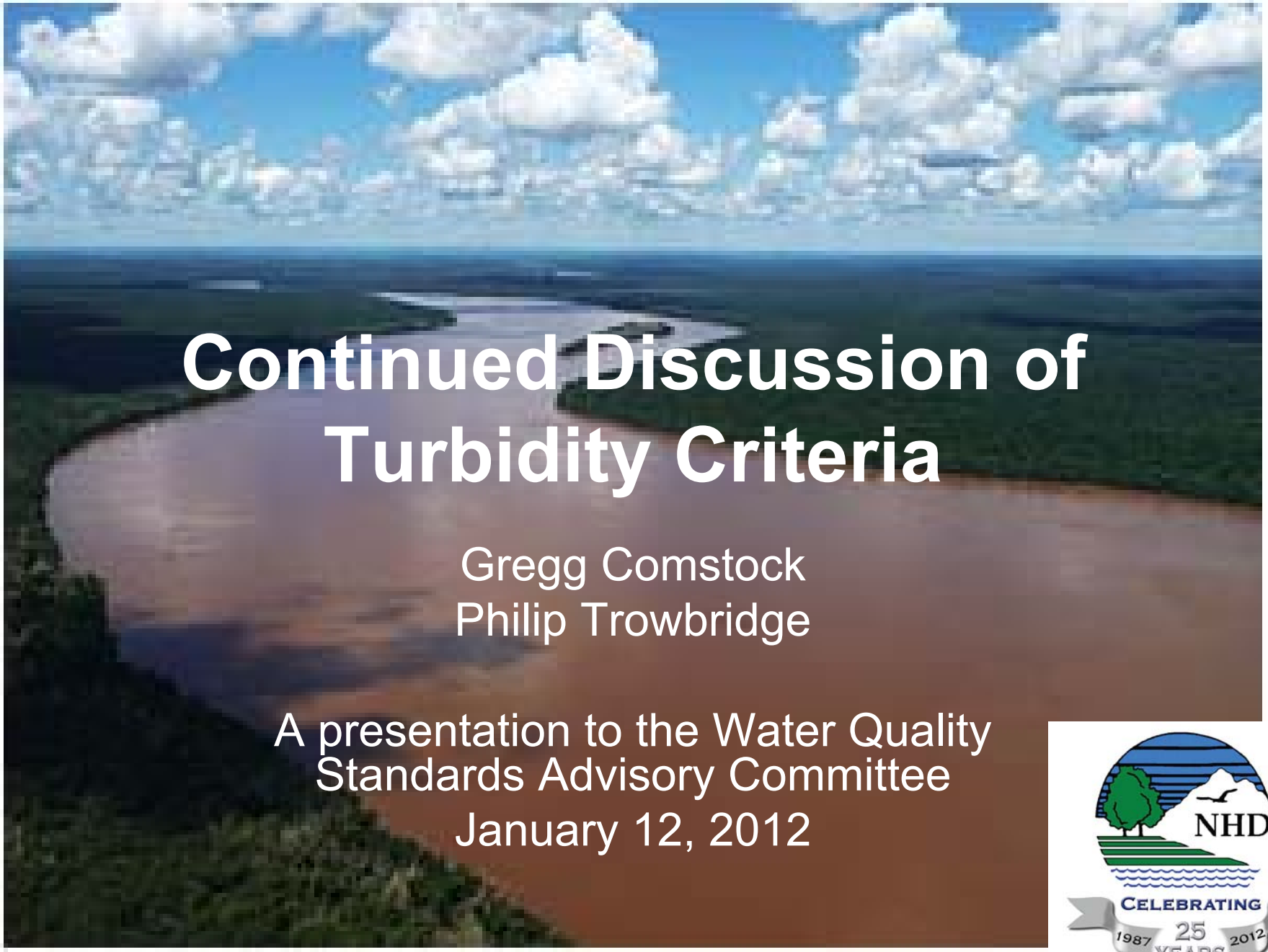

Continued Discussion of Turbidity Criteria

Gregg Comstock
Philip Trowbridge

A presentation to the Water Quality Standards Advisory Committee
January 12, 2012

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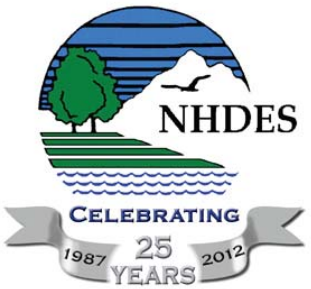
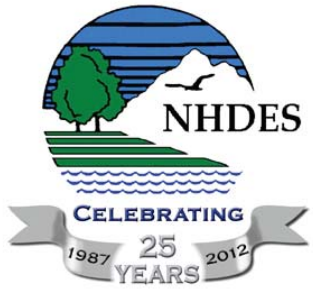
Overview

- Review relevant turbidity related criteria and regulations
- Review Current Approach on I-93 Widening Project based on existing regulations
- Review a few Options (concepts) for turbidity criteria changes and/or application of existing rules
- Discussion / initial reaction
- Focus today is on Class B criteria
  - Proposal to address Class A has been discussed



Relevant Criteria and Regulations



NH Turbidity Criteria

- Env-Wq 1703.11
- None unless naturally occurring in Class A
- No greater than 10 NTU above naturally occurring levels for **Class B**
- For state enforcement, it's a violation if discharge causes or contributes to increase of 10 NTUs or more above background

0 2 10 40 80 400 NTUs

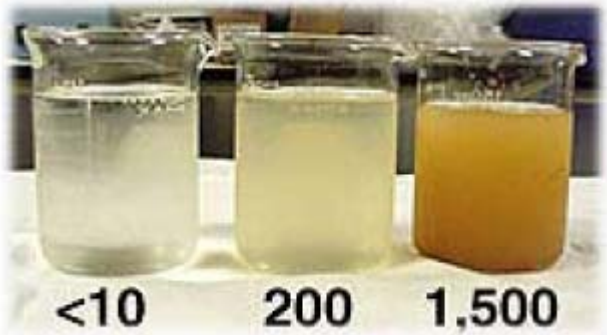


Figure 1: Sample Turbidities (Howard, 2001)

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Other Relevant Criteria

Env-Wq 1708.08 <u>Benthic Deposits</u>

(a) Class A waters shall contain no benthic deposits unless naturally occurring.

(b) **Class B** waters shall contain no benthic deposits that have a detrimental impact on the benthic community, unless naturally occurring.

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Other Relevant Criteria

- Env-Wq 1703.03 <u>General Water Quality Criteria.</u>

  (c) The following physical, chemical and biological criteria shall apply to all surface waters:

  (1) **All surface waters shall be free from** substances in kind or quantity which:

  a. Settle to form harmful deposits;

  b. Float as foam, debris, scum or other visible substances;

  c. Produce odor, color, taste or turbidity which is not naturally occurring and would render it unsuitable for its designated uses;

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Other Relevant Criteria

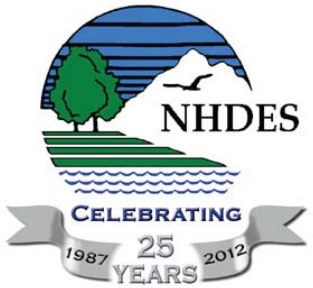
- Env-Wq 1703.21 <u>Water Quality Criteria for Toxic Substances.</u>

  (a) Unless naturally occurring or allowed under part Env-Wq 1707, all surface waters shall be **free from toxic substances or chemical constituents** in concentrations or combinations that:

  (1) Injure or are inimical to plants, animals, humans or aquatic life;

Other Relevant Criteria

- PART Env-Wq 1707 **MIXING ZONES**
- Env-Wq 1707.01 Designation.
- (a) Mixing zones shall be prohibited in Class A waters.
- (b) For **Class B** waters, the department shall designate a limited area or volume of the surface water as a mixing zone if the applicant provides sufficient scientifically valid documentation to allow the department to independently determine that all criteria in Env-Wq 1707.02 have been met.



Other Relevant Criteria

- Env-Wq 1707.02 Minimum Criteria. **Mixing zones** shall be subject to site specific criteria that, as a minimum:

  (a) meet the criteria in Env-Wq 1703.03(c)(1);

  (b) Do not interfere with biological communities or populations of indigenous species;

  (c) Do not result in the accumulation of pollutants in the sediments or biota;

  (d) Allow a zone of passage for swimming and drifting organisms;

  (e) Do not interfere with existing and designated uses of the surface water;

  (f) Do not impinge upon spawning grounds and/or nursery areas of any indigenous aquatic species;

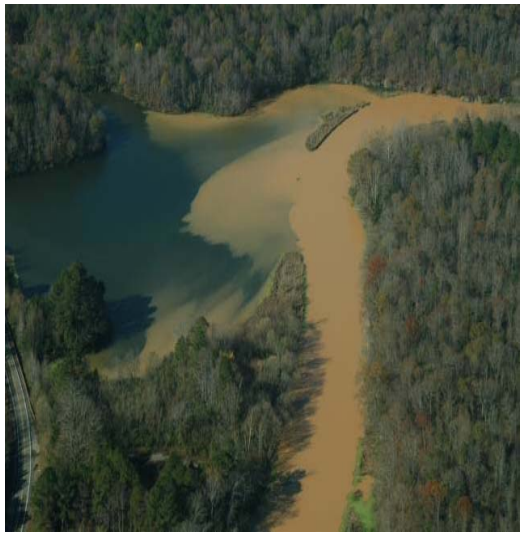
  (g) Do not result in the mortality of any plants, animals, humans, or aquatic life within the mixing zone;

  (h) Do not exceed the chronic toxicity value of 1.0 TUc at the mixing zone boundary; and

  (i) Do not result in an overlap with another mixing zone.

Other Relevant Regulations

- RSA 482-A - <u>Fill and Dredge in Wetlands</u>
  - "Fill" means any rock, soil, gravel, sand or other such material that has been deposited or caused to be deposited by human activity (Env-Wt 101.42).
  - Can't fill or dredge wetlands without permit (RSA 485-A:3,I.a)
  - Can't issue permit if it will infringe on the property rights or unreasonably affect the value or enjoyment of property of abutting owners (RSA 482-A:11, II)



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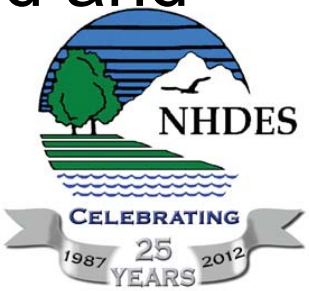
Summary of Relevant Criteria

- Turbidity can't result in
  - injury, harm or mortality to aquatic life
  - harmful benthic deposits
  - filling of wetlands without a permit
- It's a violation if discharge causes or contributes to increase of 10 NTUs or more above background
  - Compliance point can be at end of mixing zone (MZ) if MZ is requested and granted and MZ criteria are met



Options

- Current Approach used for I-93
  - Mixing zones and compliance monitoring
- Alternatives (Concepts)
  - Narrative Variance for Highway Projects with BMPs
  - Define Turbidity Criteria as a Long-Term Average
  - Develop Limited Duration Criteria

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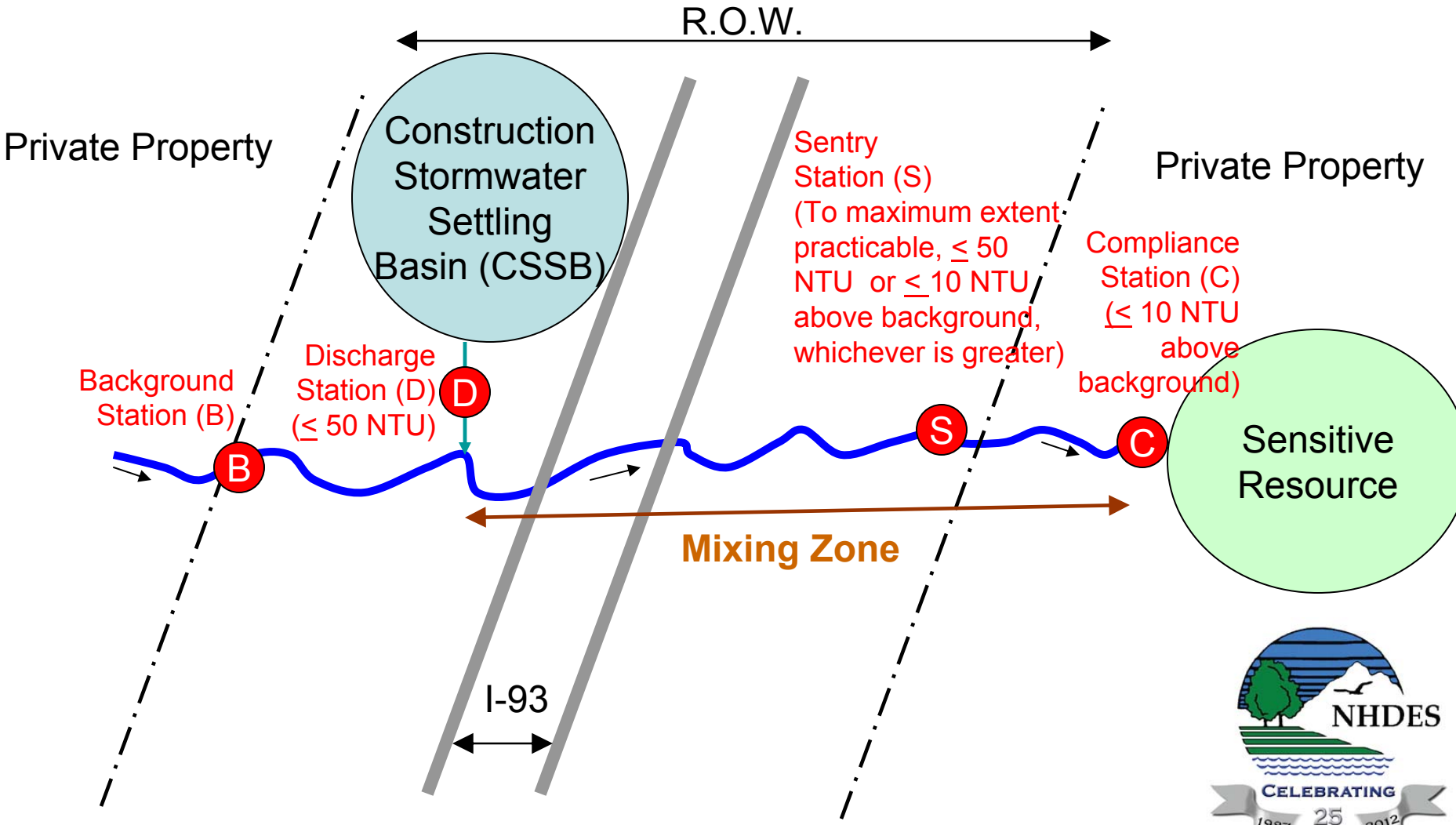
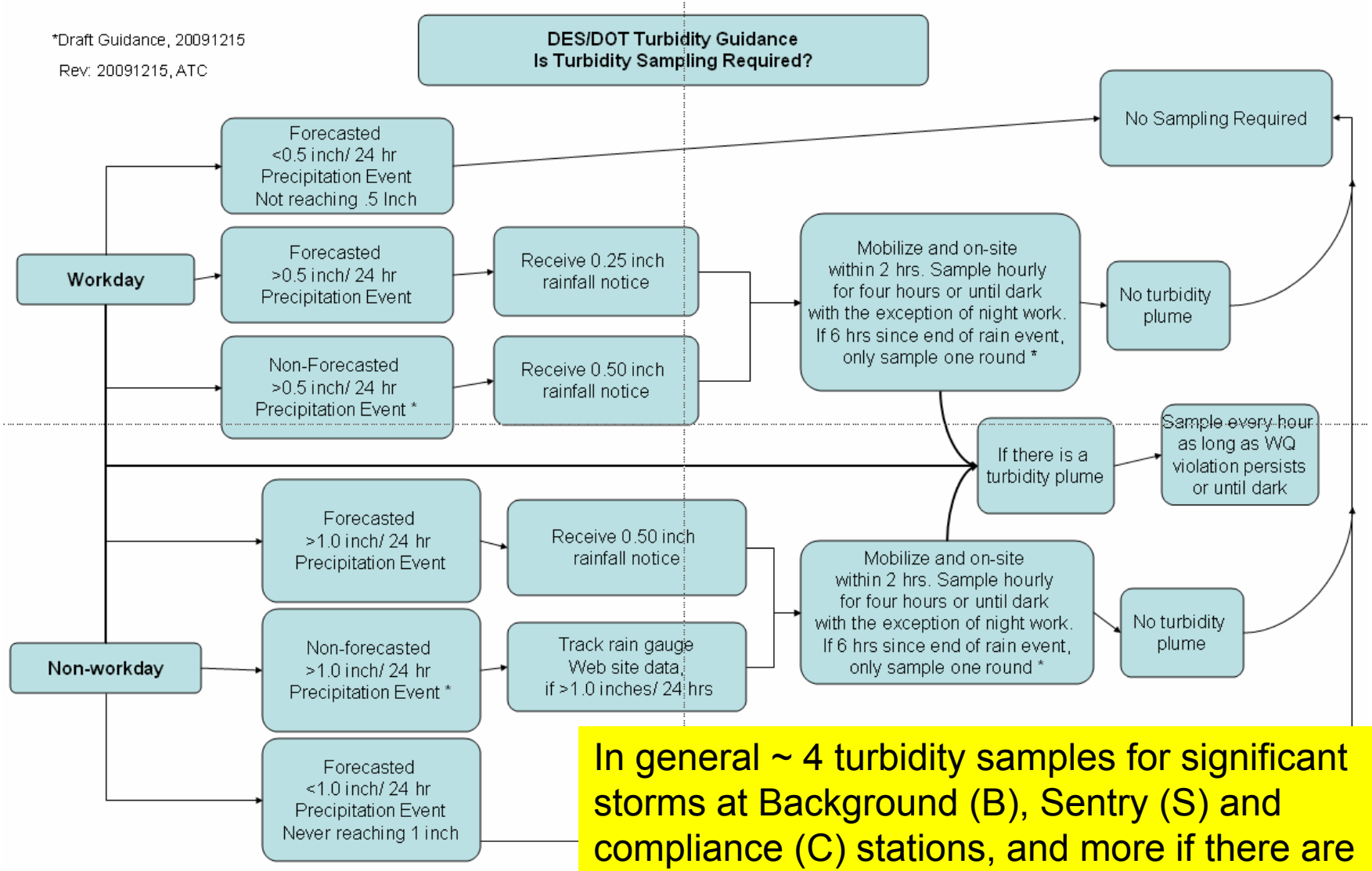
Current Approach for I-93: Mixing Zone and Compliance Monitoring

Current Approach for I-93: Mixing Zones, Compliance Monitoring



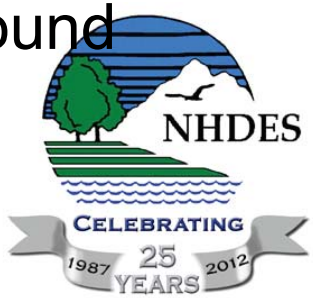
Typical I-93 Wet Weather In-Stream Turbidity Monitoring



In general ~ 4 turbidity samples for significant storms at Background (B), Sentry (S) and compliance (C) stations, and more if there are violations or a visible plume

Other I-93 Monitoring Requirements

- Turbidity monitoring of Discharges (D) from Construction Stormwater Settling Basins (CSSBs)
  - Typically at least 2 samples per day
  - Discharges can occur during wet or dry weather up to 72 hours unless otherwise authorized by DES
- Instream turbidity monitoring during small storms or dry weather when CSSB discharges occur
  - Typically at least 2 samples per day at Background (B), Sentry (S) and Compliance (C) stations



Other I-93 Monitoring Requirements

- Benthic Deposit Inspections
  - Visually inspect accessible portions of mixing zone (usually with photos)
  - Required any time there is a construction stormwater discharge to the mixing zone of greater than 10 NTU.

Current Approach for I-93: Mixing Zones and Compliance Monitoring

Pros

- No rule change necessary
- Provides evidence of compliance with relevant criteria
- High degree of flexibility

Cons

- Staff time / expense to prepare mixing zone/turbidity monitoring plans and to sample and report for compliance.
- Perceived inequality of application between projects/applicants.

Note: A possible variant on this option is a rule change to establish default mixing zones for highway projects.

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Alternative: Narrative Variance for Highway Projects with BMPs

Concept Example: Turbidity standards are met if BMPs meet AoT specifications for highway projects.

Pros

- Less or no monitoring.
- Emphasis on BMP compliance.

Cons

- EPA will not approve criteria that are just BMP based.
- If no monitoring, compliance is presumed when in fact violations may actually be occurring
- Big assumption that BMPs are working without monitoring
- Rule change required.

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Alternative: Define Turbidity Criteria as a Long-Term Average

Concept Example: 10 NTU above background is the average over some specified time frame (days? months?)

Pros

- Allows for some releases at higher turbidity so long as the long-term average is maintained.

Cons

- No short-term cap
- More difficult to determine compliance.
- Frequent and regular monitoring needed to make sure all relevant criteria are met.
- The longer the duration, the more monitoring required.
- Requires rule change.

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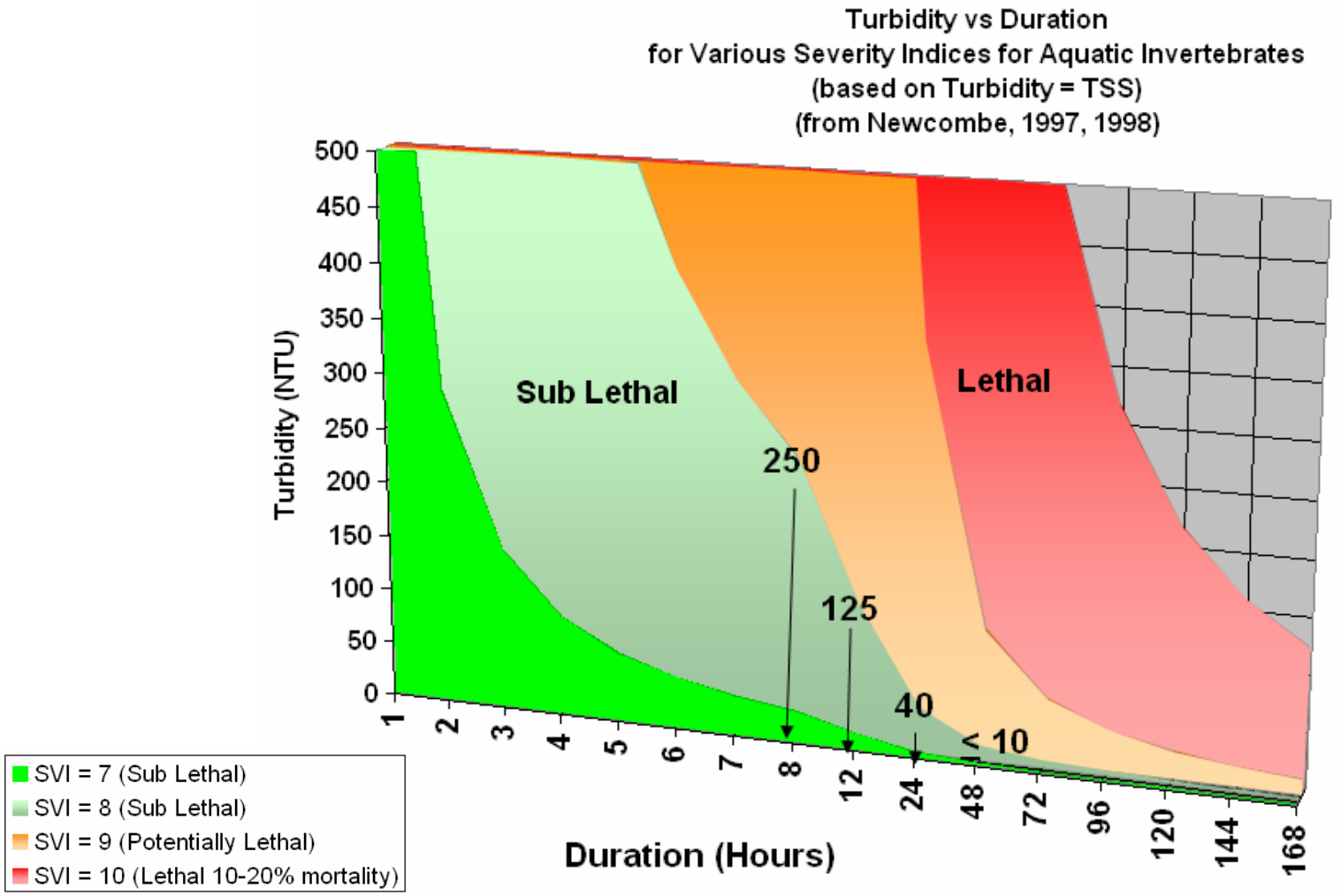
Alternative: Develop Limited Duration Criteria



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Alternative: Develop Limited Duration Criteria

Concept Example: Turbidity standard shall include short-term acute standards over specified time frames, ultimately meeting 10 NTU above background as a chronic standard.

Pros

- Allows for some releases at higher turbidity so long as the long-term average is maintained.
- Has a turbidity cap

Cons

- More difficult to determine compliance.
- Frequent and regular monitoring would be needed to make sure all relevant criteria are met.
- The more criteria/duration combinations, the more sampling required.
- May need to define rest period if there are violations
- Requires rule change

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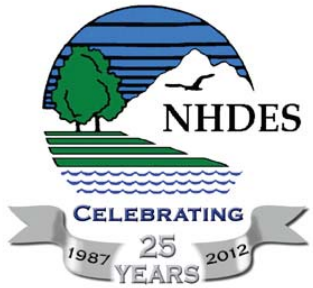
Discussion of Options

- Current Approach based on existing criteria
  - Or with rule change with default mixing zone for Highway projects
- Narrative Variance for Highway Projects with BMPs (BMP based)
- Define Turbidity Criteria as Long Term Average
- Develop Limited Duration Criteria



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